

The Effect of Innovation on Exports: A Dynamic Panel Analysis

Bettina Becker, Stefan Lachenmaier

Ifo Institute for Economic Research, Munich, Germany

Abstract:

The major objective of the paper is to test empirically the prediction of the product cycle theory of international trade in a panel of manufacturing firms. In these models, innovation is identified as the driving force behind the exports of industrialized countries. Open economy models of endogenous growth however endogenize the rate of innovation and predict that exports may themselves be a cause of innovative activities. Recognizing the general truism that correlation need not mean causation, the potential endogeneity of innovation to trade poses a significant problem for empirical tests of trade theories.

The existing empirical literature on innovation and exports tends not to take account of potential reverse causation effects and interprets a conditional correlation between exports and innovation proxies as evidence in support of the product cycle hypothesis. In the light of the findings of the relevant endogenous growth models and in absence of tests distinguishing effects through correlation from effects through causation, however, the evidence does not allow conclusions to be drawn on the direction of causation.

We employ a uniquely rich German micro dataset which allows for the adoption of a dynamic panel estimation strategy. Thus in contrast to cross-section studies in this area, we take account of both the time and the cross-section dimension in the panel analysis, which allows controlling for dynamic effects as well as unobserved heterogeneity between the firms by eliminating fixed effects through estimating a first-differenced model. Following Blundell and Bond (1998), we use the GMM system estimator to control for dynamics in export behaviour as well as the possible endogeneity of the innovation variable.

The data are drawn from the Ifo Innovation Survey conducted annually among German manufacturing firms. The data offer additional instruments to be exploited in estimation: In addition to reporting whether or not the firms innovated in the preceding year and what the size of the investment was when innovations were undertaken, firms report whether certain impulses or obstacles furthered or hindered their innovative activity, respectively. The impulse and obstacle variables are correlated with the variable to be instrumented, but can reasonably be viewed as being exogenous to firms' export share and the error term of the regression, thus meeting the two requirements of a valid instrument. The regression coefficient on innovation thus abstracts from any reverse causation effects and measures the causal impact of innovation on export performance only.

We estimate an econometric model of firms' exports share using the unique German micro dataset for the years 1997-2003. The analysis also contributes to the literature by allowing for an impact of macroeconomic variables which to our knowledge have been neglected in the innovations and exports literature to date. This may be surprising in the light of the role trade theory ascribes to fluctuations of relative exchange rates in determining domestic firms' international competitiveness. Additional control variables include linear and non-linear firm size.